FOR DESTROYING BACTERIA.

FOR DEALING WITH IMPURITIES OF ALL KINDS.

FOR REMOVING IRON.

CANDY WATERWORKS FILTERS

THE CANDY FILTER COMPY LD
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HIGHEST AWARD, 1910,
GIVEN FOR CANDY FILTERS.

THE ROYAL SANITARY INSTITUTE.

OF GREAT BRITAIN.

CHICAGO.

THE CANDY PATENT "COMPOUND" FILTER.

PARIS.

AERATING AND OXIDIZING SYSTEM.

INSTALLATION OF SIX

CANDY AERATING AND OXIDIZING FILTERS

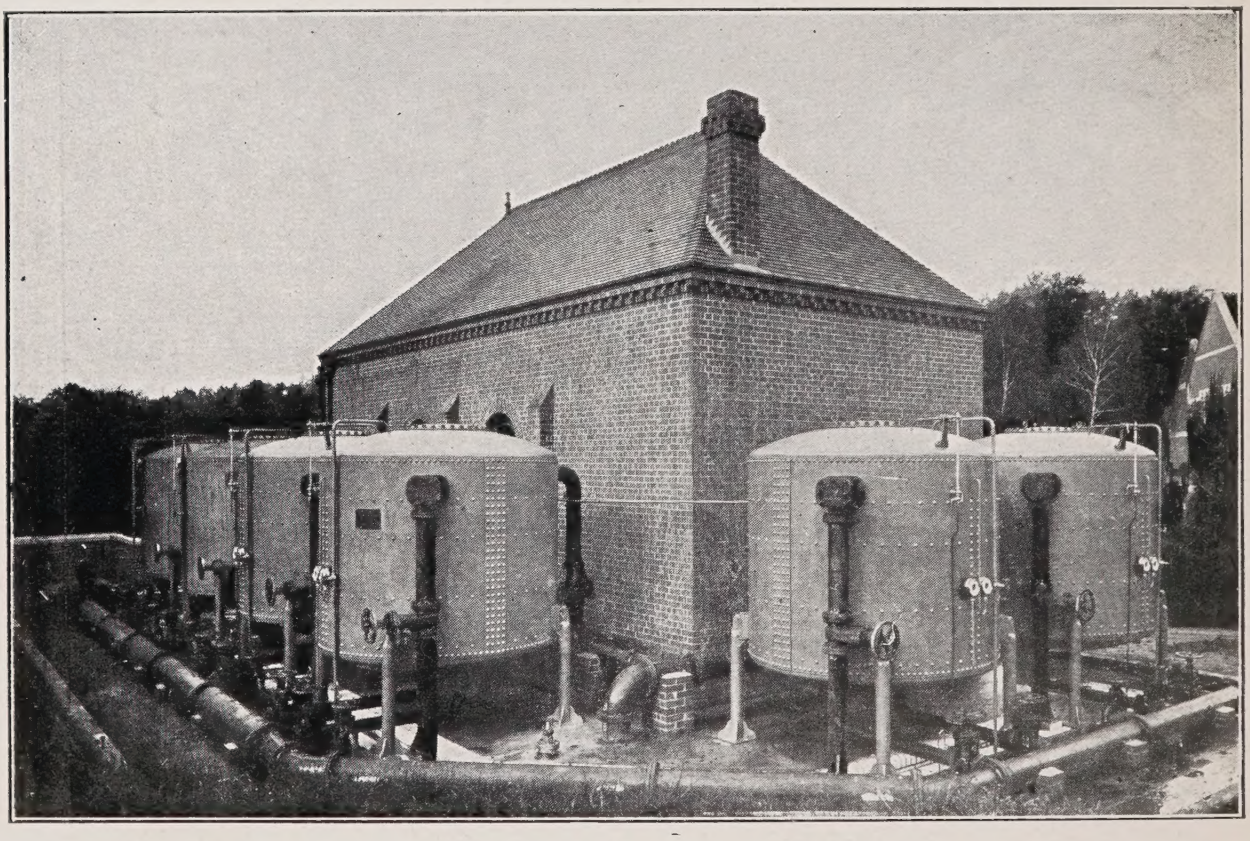
FOR REMOVING IRON IN SOLUTION

FROM

THE WATER SUPPLY

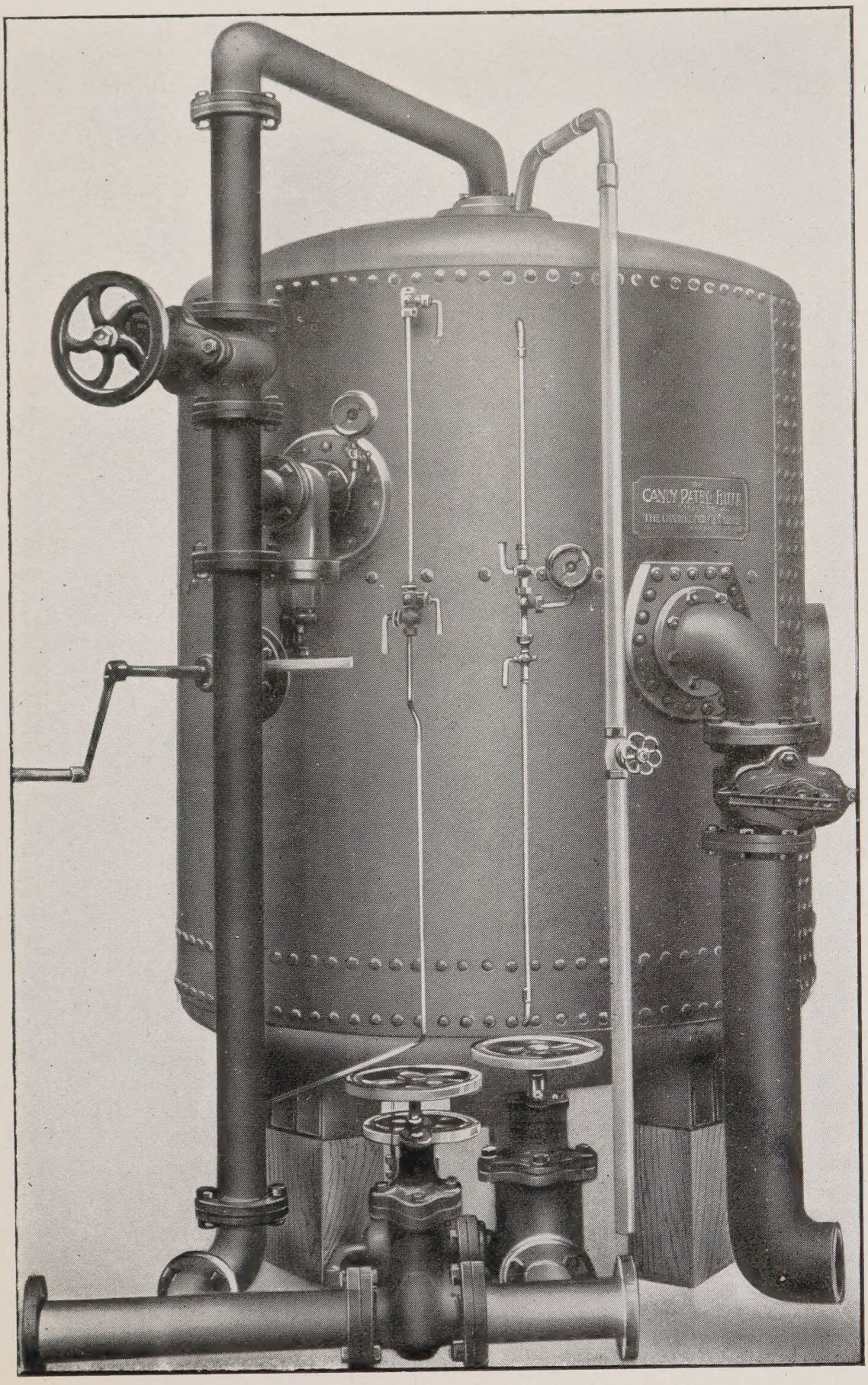
OF

THE ROYAL BOROUGH OF TUNBRIDGE WELLS.

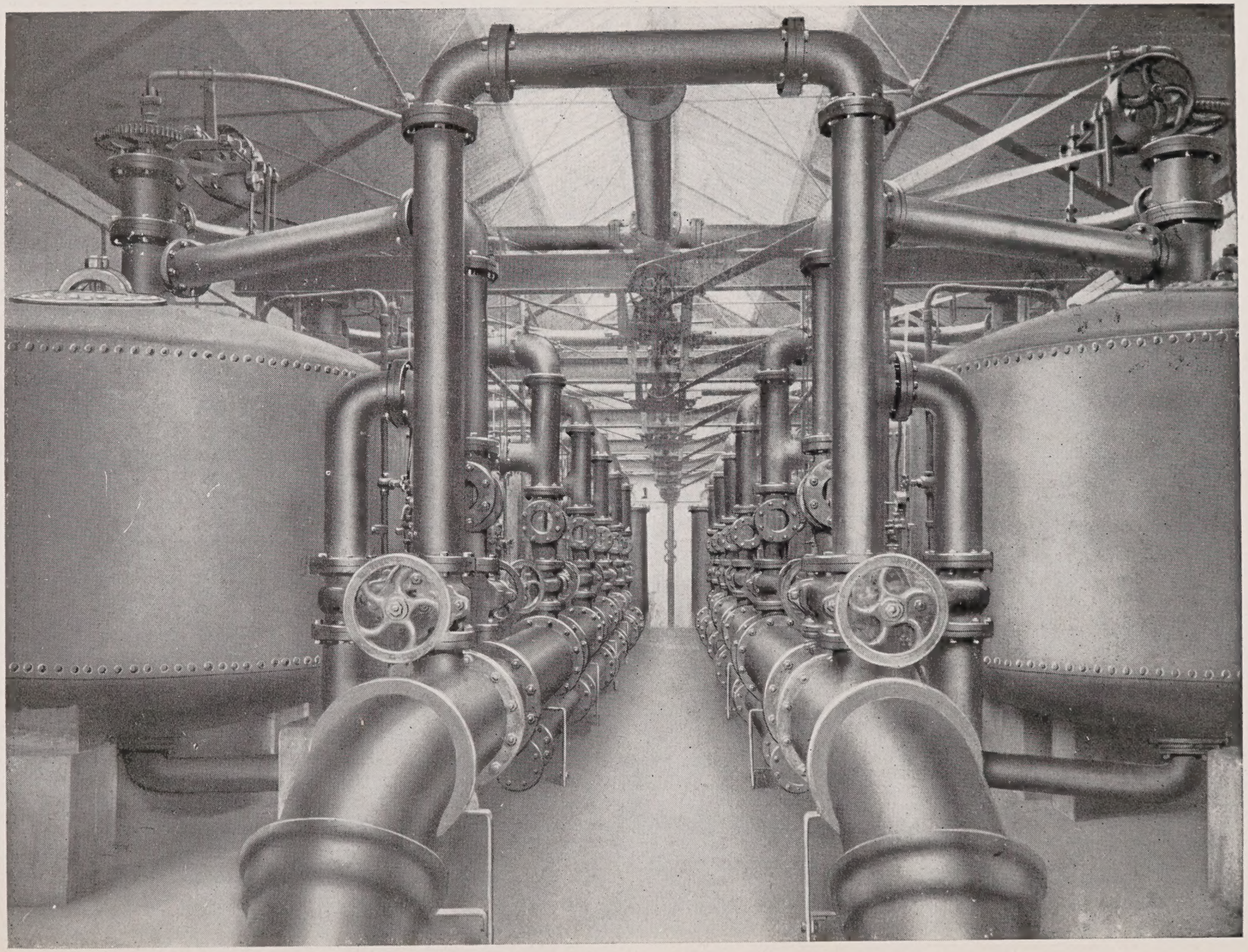


THE FILTERS WERE ERECTED IN 1908, AND ARE CAPABLE OF FILTERING ONE MILLION GALLONS PER DAY

CANDY PATENT "COMPOUND" FILTERS.



(For Section see page 8.)



THE INSTALLATION OF TWELVE CANDY FILTERS AT THE TORQUAY RESERVOIRS.

Capacity 2¼ million gallons per day.

HIGHEST AWARD, 1910,
GIVEN FOR CANDY FILTERS.

THE ROYAL SANITARY INSTITUTE

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CHICAGO.

PARIS.

THE CANDY PATENT "COMPOUND" FILTER.

AERATING AND OXIDISING SYSTEM.

THAT mechanical filtration is rapidly gaining ground in this country is an undoubted fact, because the advantages, offered by a suitable mechanical filter over the open sand filter, are daily becoming more thoroughly recognised and appreciated. The ordinary mechanical filter, where the water simply passes through a single layer of sand, does not however always fully meet the requirements of both the Engineer and Analyst, no matter however ingenious may be the method of cleaning the sand.

What is necessary for the scientific treatment of water, is to provide, for each special problem in water purification, a mechanical filter of a special design and type.

Take for instance the case of a water, satisfactory in every way except that it contains too many B. Coli ;—or a water containing iron in solution ;—or a water containing an exceptional quantity of suspended matter. Neither the ordinary sand filter, nor the ordinary mechanical filter will, of itself, deal with these varying requirements in a manner that can be considered absolutely satisfactory ; *because principles, quite different in detail, must be employed to cope with each varying condition instanced.*

It is because they fully recognise and appreciate these facts, that the Candy Filter Co. have designed and perfected, as the result of long practical tests, different types of Candy Filters to deal with different types of water by their patent Aerating and Oxidizing System ; and, in this way, they are enabled to secure better results than can be produced from the open sand filter, or from the ordinary mechanical filter.

In the first case previously instanced (where a water is satisfactory except as regards the presence of B. Coli) Candy "De-Clor" Bacteria Destroying Filters are being adopted, with entirely satisfactory results, to finally purify water that has been already filtered through open sand filters. The ordinary mechanical filter would be practically useless in such a case, because it cannot ensure the absolute destruction of the B. Coli.

Again, Candy Aerating and Oxidizing Filters for removing iron, have, in many instances, replaced open

sand filters, and have produced superior results in so economical a manner that the cost of the Candy Filters has been saved in a few years. In cases where open sand filters, with aeration towers, cascades or basins, could not be employed on account of considerations of space or for other reasons, Candy Iron-removing Filters have been installed with the greatest success ; and here, again, the ordinary mechanical filter would have been of little service.

Full information of the Special Bacteria Destroying Filter—The "De-Clor"—and of the Special Candy Oxidising and Iron-removing Filter, will be forwarded on application ; but our desire in these Particulars is to set out, at some detail, the advantages of the improved CANDY "COMPOUND FILTER," which we claim affords the best and most scientific mechanical treatment of water, both as regards elimination of suspended matter, and the subsequent removal of the said matter from the filter.

The suspended matter in water, whether present naturally, or produced artifically by the addition of a coagulant, is of varying sizes of fineness, *and the variation of size is very considerable.* It will be evident that while grit or very coarse sand is effective for removing the coarse particles of suspended matter, fine sand or silica must be employed to keep back the finest particles of suspended matter, otherwise the filtration will be imperfect.

Now when water is passed through a single layer of sand at a high speed, as in the ordinary mechanical filter, the sand must be fine, and, consequently, the *surface* of the sand retains the bulk of the suspended matter, which, accumulating rapidly, necessitates comparatively frequent cleanings, and consequent disturbance, of the filter. If the material in the filter were composed of coarse grit at the top, grading to fine sand lower down, the filter would work for a much longer period without requiring to be cleaned, and better results would be produced. This is however impossible with the ordinary mechanical filter, as the first time that the filter was cleaned the coarse material from the top would become mixed up with the fine material that was originally below it.

In the CANDY Patent "COMPOUND FILTER," the difficulty is overcome by providing, in the filter *two* permanently separated filtering layers or beds. The upper bed, termed the "pre-filter," is a comparatively coarse one, and is supported upon a perforated false floor; the lower bed is composed of fine sand or silica, and there is a space of about two feet between the said false floor and the surface of the fine sand bed below it, which also rests upon a false floor furnished with special gun-metal or porcelain nozzles. To put the matter briefly the CANDY Patent "COMPOUND FILTER" is a mechanical filter, *plus* a combined pre-filter; so that

the water undergoes a double and progressive process of filtration. The coarser particles of suspended matter in the water are eliminated in the comparatively coarse pre-filter, thus preventing them from reaching the fine filter, and, in addition to this important advantage, a valuable aggregating or "snowball" action takes place in the pre-filter, by which the physical condition of the finest particles is so altered that their power of sealing the sand is enormously reduced.

A very careful and comparative series of tests have shown that the CANDY Patent "COMPOUND FILTER" *will work approximately three times as long as the ordinary single-bed mechanical filter without requiring to be cleaned.* The advantages of this most important improvement in mechanical filtrating will be at once apparent, as fewer filters are required, and the percentage of wash water and the supervision necessary are both reduced to the minimum.

In the washing process, both the fine bed and the coarse or pre-filter bed are cleaned at the same time, and at the same operation ; the procedure being not only absolutely effective but also extremely simple. The fine bed is cleaned by a reversed flow of filtered water (which loosens the sand) *acting in combination with powerful streams of water issuing under pressure from an arm that is slowly rotated just above the level of the sand.* These streams of water discharged from special gun-metal jets at a velocity of

from *40 feet to 60 feet per second*, penetrate the whole depth of the loosened sand, and then, combining with the upward-flow water, rise through the sand, rapidly carrying away the suspended matter that has been freed by the intensive scouring action produced.

It will be evident that important advantages are obtained by this improved method of cleaning the sand. In the first place, the top surface, which is the dirtiest, is at once broken up, while, as the washing effect is concentrated on a small part of the bed at a time, a more thorough rapid, and perfect cleaning is obtained than when the washing water is distributed over the whole body of the bed.

Furthermore, the rotation of the scour-arm, from which the jets of water issue, ensures that every square inch of the bed shall be subjected in turn to the concentrated scouring; and the rotating arm, being above the sand instead of immersed therein, is turned so easily that engine power is unnecessary (although it may be employed if available).

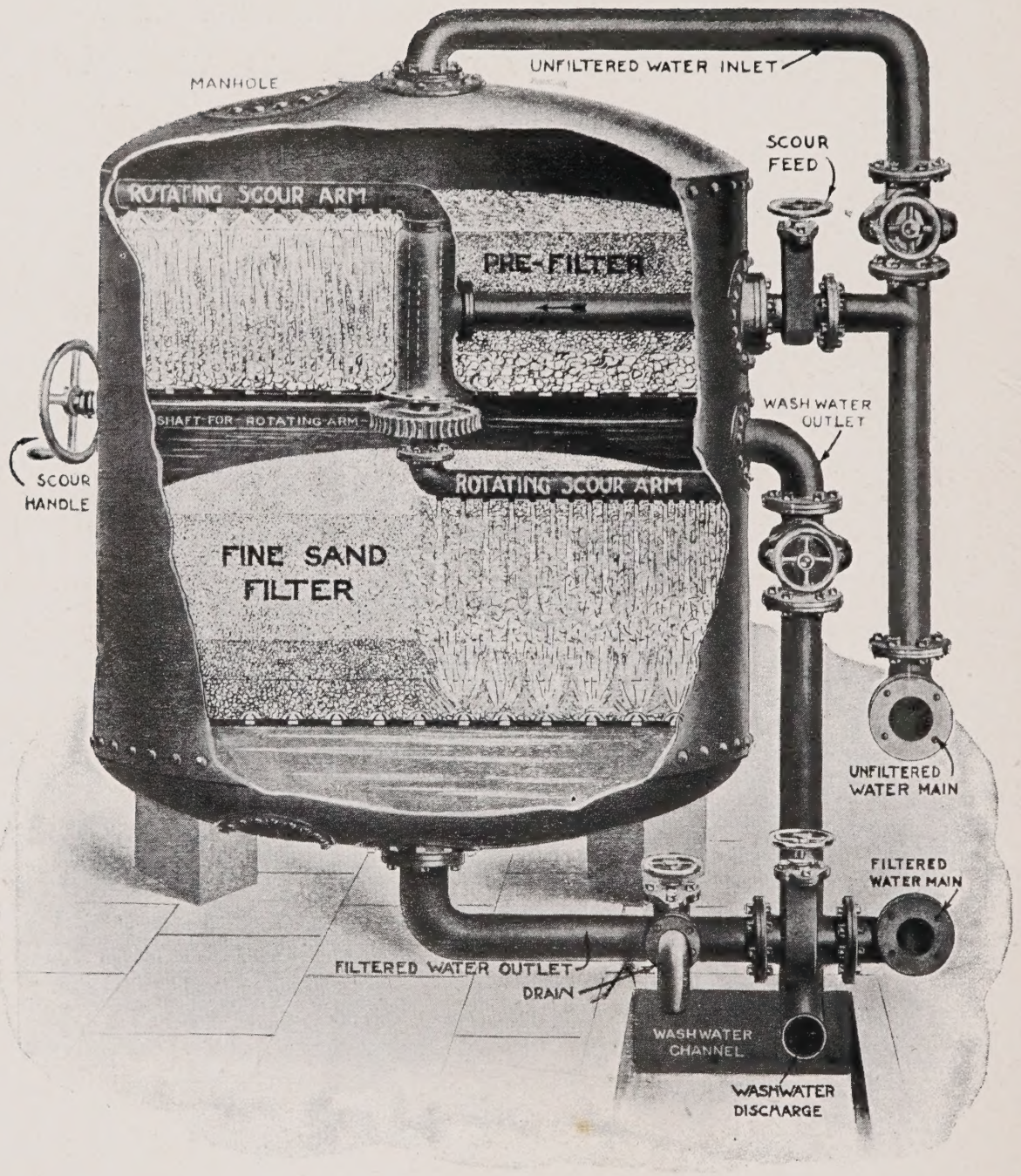
For the same reason, breakage of the cogs of gear wheels cannot occur, a fault to which some types of mechanical filters are liable; moreover, as the scour-arm is not in the sand, troublesome, spring valves on the jets are dispensed with, and, when the filter is working, there is no tendency for a portion of the water to creep under the arms and so be discharged in a condition not fully purified.

A second scour-arm, working in conjunction with the scour-arm previously referred to, discharges powerful streams of water on the top of the pre-filter, and these streams, rushing down through the coarse material, wash from their surfaces the matter deposited thereon and carry it away through the wash-out pipe.

It must be remembered that the suspended matter is retained in the coarse pre-filter, not by a wedging or sieving action, but by mere surface adhesion (as dust will cling to a wall) and it is therefore readily removed by the streams of water rushing through the coarse material, which, when being cleaned, is not waterlogged (as when working), but has its interstitial spaces occupied by air.

It is only while the filter is being cleaned that the handle is rotated and the water issues from the scour-arms. The water pressure required for the hydraulic scours is from 20 to 35 feet, and for the reversed "upward-flow" the pressure required is from 6 to 10 feet; gauges are provided so that the attendant can see at once when the most effective pressure is obtained.

It is a feature of considerable advantage with the Candy Filter that unfiltered water can be used for the hydraulic scours. The water used for the reversed "upward flow" should be filtered water.



SECTIONAL PERSPECTIVE VIEW
OF THE CANDY "COMPOUND" FILTER.

While the Filter is being cleansed, the unfiltered water inlet valve is closed, the wash water outlet valve, the scour feed valve, and the filtered water valve, are opened, and the scour-handle is rotated. An air valve, not shown in the illustration, admits air to the upper part of the filter during its cleansing, so that immediately the wash water valve is open, the water in the top of the filter rushes down through the pre-filter giving it a preliminary flushing ; the water level within the filter being then as shown in the illustration. The Pre-filter is washed by the spray-jets of water issuing from the upper rotating scour-arm ; while the fine Sand Filter is washed by the powerful streams of water that issue at the same time from the jets in the lower rotating scour-arm ; the layer of fine sand being loosened by an upward flow of filtered water entering through the filtered water valve. The dirty washing water is discharged into a drain. Provision is also made (if required) for occasional washing of the pre-filter with an upward flushing, by closing the wash water valve and opening a flushing valve (not shown) on the unfiltered water pipe above the unfiltered water inlet valve.

After the washing operation, which occupies from 10 to 15 minutes only, the Filter is set to work again by closing the scour and wash water valves and opening the unfiltered water valve ; the filtered water valve remaining open.

The drain valve is always kept closed, except when it is required to empty the Filter of water.

When in working operation, the unfiltered water enters the Filter through the pipe connected to the top dome, and, after passing through the two filtering beds, flows away in a purified condition through the pipe connected to the bottom dome.

The special collecting and distributing nozzles, employed in the Candy Filter, are of an improved type that are not liable to become choked or to wear out, and do not require renewing from time to time as with other filters.

For those cases where the water to be filtered does not require chemical treatment and contains *only small quantities of suspended matter*, the Candy Filter Company supply *single-bed filters*, with the "hydraulic-scour" system of cleansing, and they also manufacture filters, for special purposes, with an air-scour as well as the hydraulic-scour. For waters with an exceptionally corrosive action on iron, filters lined with impervious stoneware can be supplied.

For certain waters, especially those containing iron, the well known special filtering material "POLARITE" is employed in addition to the sand.

Candy Filters are provided with special fittings to enable them to be operated in the most effective, convenient and economical manner. All the valves are arranged in the front of the filter and at

a convenient height, while pressure gauges are supplied, so arranged as to indicate when the filter requires cleaning, and to show the correct pressure for this operation. A special calibrated indicator, termed an "Index Valve," tells the *quantity* of water that the filter is dealing with, and enables the attendant to regulate a battery of filters so that each is always dealing with its proper volume; provision is also made to plainly show the "wash-water" in order that the attendant may see when the cleansing operation is completed

For those waters where it is advantageous to treat the water with a coagulant (such as Sulphate of Alumina) prior to filtration the Candy Patent "HYDRO-PNEUMATIC INJECTOR," which operates without any working parts, enables a solution of any chemical to be automatically injected into the water main; the "Hydro-Pneumatic" Injector works in conjunction with a "venturi" tube so that the chemical solution is automatically added pro-portionately to variations in the flow. These patent injectors have been in successful operation for over two years working with such different reagents as alumino-ferric, chlorine and caustic soda.

Where the water calls for the use of chalk, or lime, these reagents are added by means of small special phosphor-bronze plunger pumps, driven from a turbine placed in the water main; the same turbine may, in large installations, be employed to turn the hydraulic scours when the filters are being cleaned.

The following are a few of the principal towns where Candy Filters have been adopted for purifying the Public Water Supply :—

READING	TRURO
TORQUAY	TUNBRIDGE WELLS
HARROGATE	COWES (Isle of Wight)
NEWPORT (Mon.)	LIVERPOOL (Public Baths)
HASTINGS	BIRMINGHAM ,,
CARDIFF	NUNEATON

PONTYPRIDD & RONDDHA WATER BOARD.
BIGGLESWADE WATER BOARD.

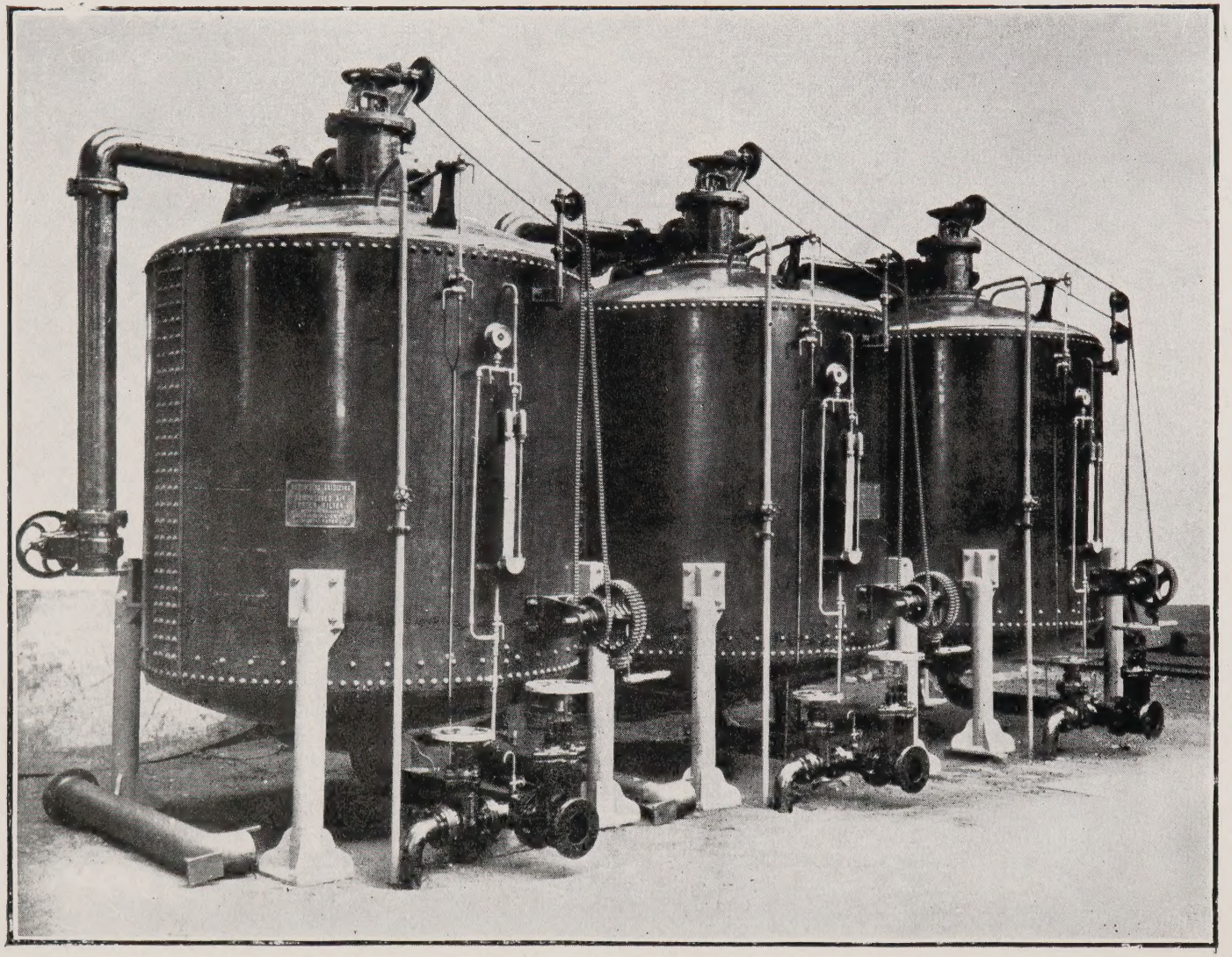
Candy Filters are also used by H. M. Government, by several Colonial Governments, and in Australia, New Zealand, S. Africa, China, N. and S. America, & on the Continent. Many Water Companies, Public and Private Institutions, Laundries, Estates, Mansions and Industrial Works, are users of Candy Filters.

Further information concerning all Types of Candy Filters, with estimates for dealing with any volume of water, and for obtaining any required degree of purification will be supplied on application to

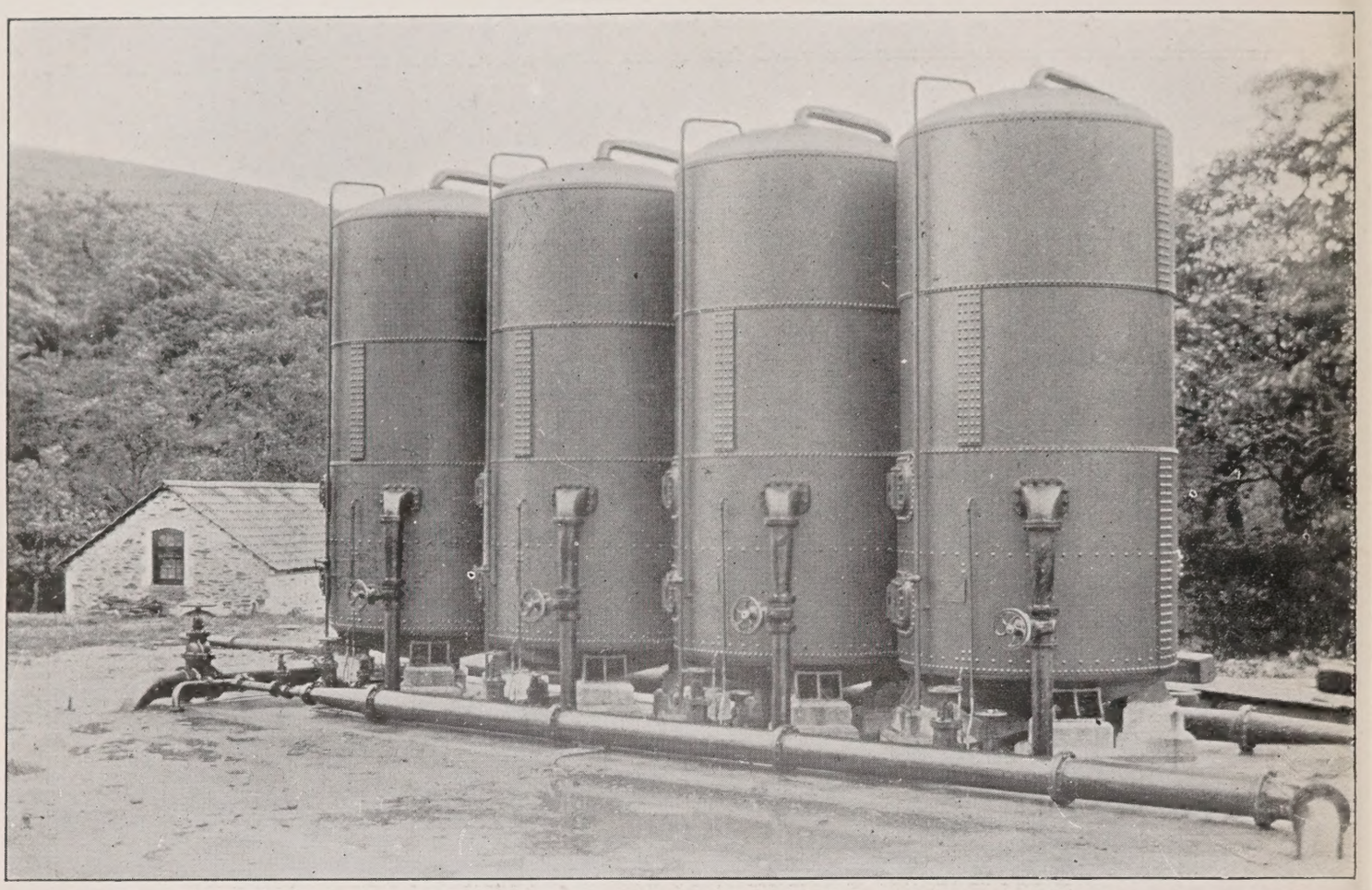
The CANDY FILTER CO. Ltd.,
5, Westminster Palace Gardens,
Westminster, London, S.W.

Telegrams & Cables : " CIMOLITE LONDON."
Code A.B.C. 5th Edition.

Telephone:
1057 VICTORIA.

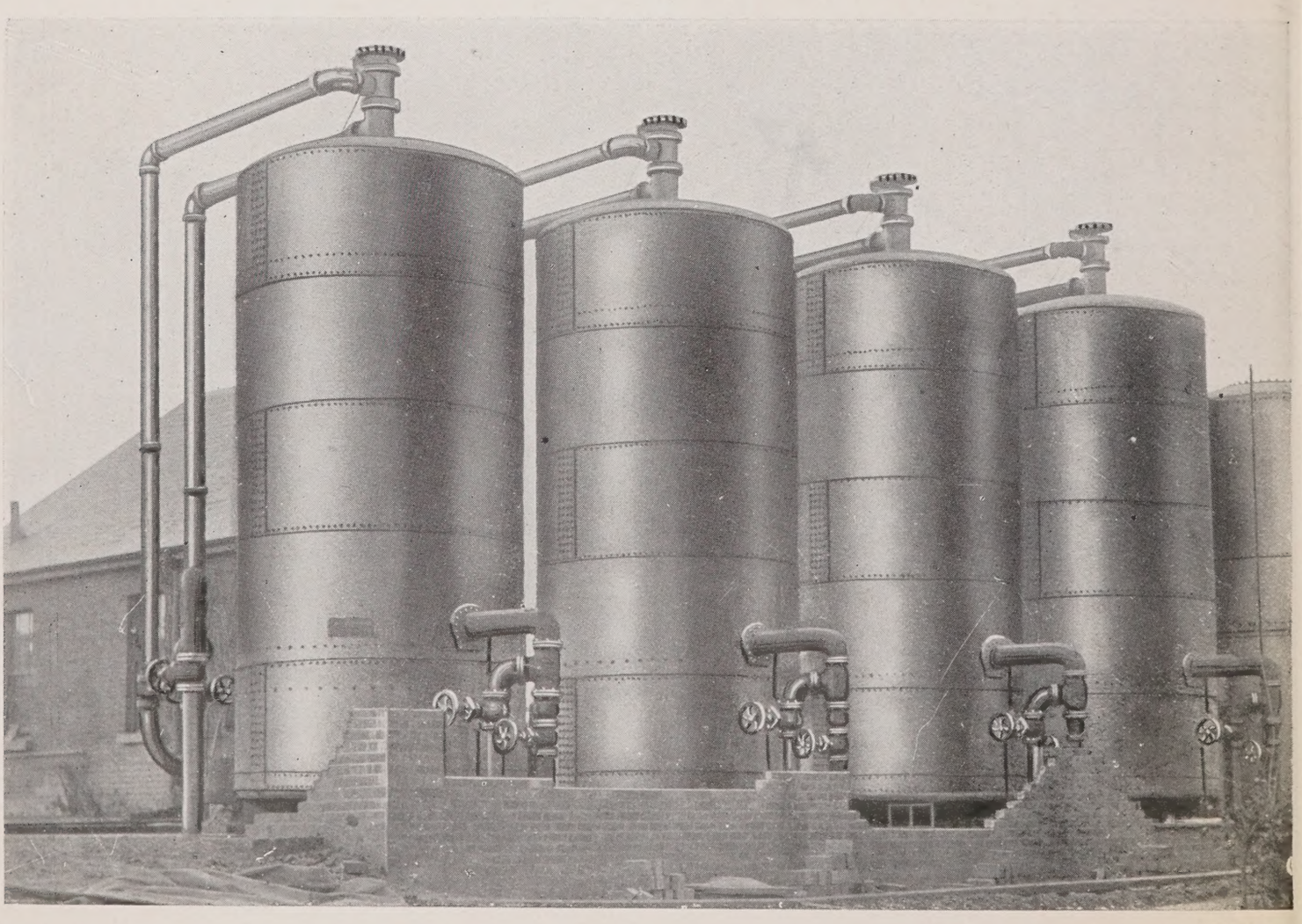


INSTALLATION OF THREE "HYDRAULIC-SCOUR" SINGLE-BED FILTERS
FOR A COLONIAL GOVERNMENT.



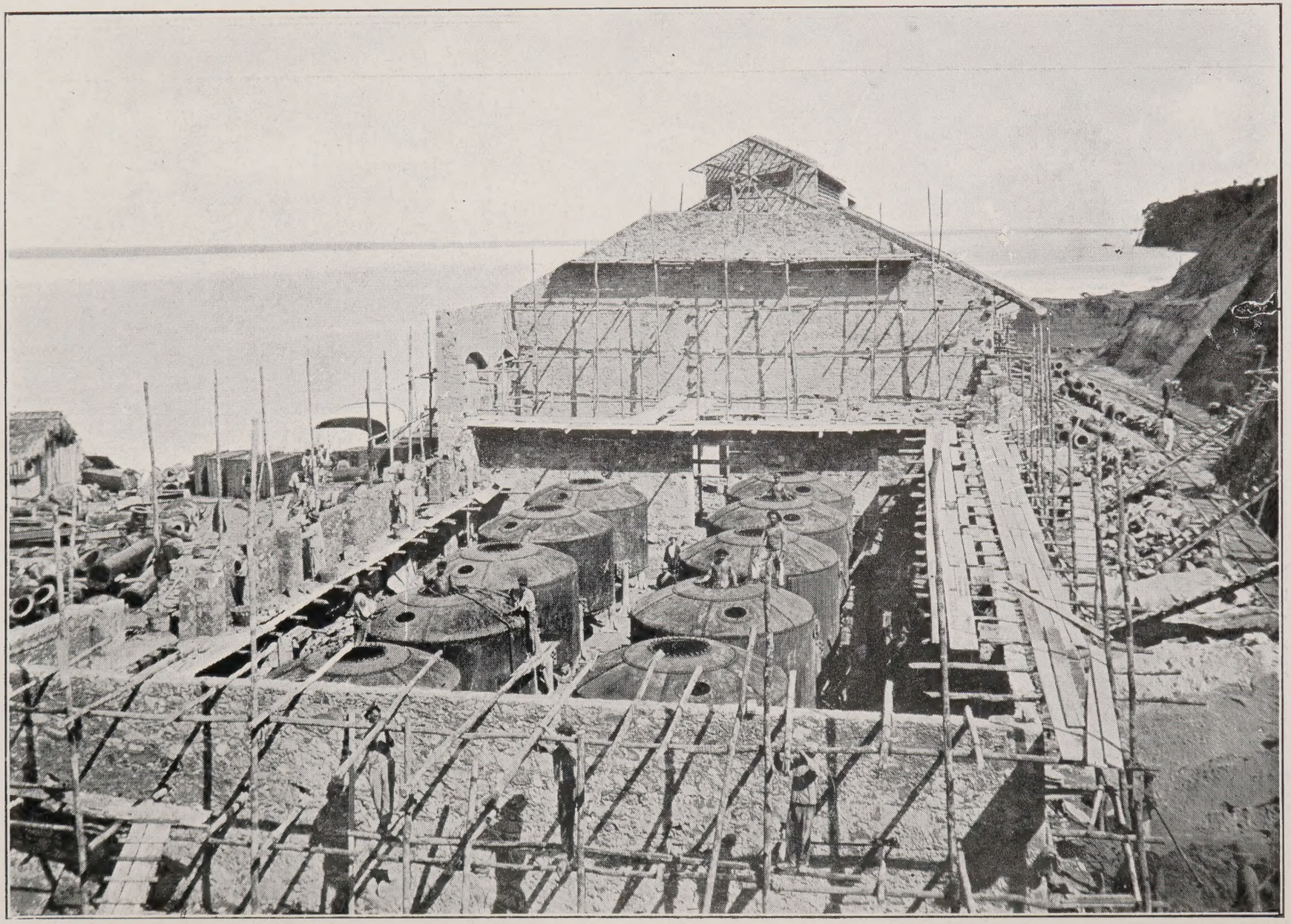
INSTALLATION OF DE-CLOR FILTERS FOR THE TRURO WATER CO.

Capacity 1 *million gallons per day.*



INSTALLATION OF DECLOR FILTERS (*"Combined" Type*) FOR THE READING CORPORATION

Capacity 1 *million gallons per day.*



INSTALLATION IN SOUTH AMERICA OF TEN CANDY FILTERS, EACH 12 FEET IN DIAMETER

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CHICAGO.

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THE CANDY FILTER Co., Ltd.,

5, Westminster Palace Gardens,

Westminster,

London, S.W.

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FOR DESTROYING BACTERIA.

FOR DEALING WITH IMPURITIES OF ALL KINDS.

FOR REMOVING IRON.

CANDY WATERWORKS FILTERS

THE CANDY FILTER COMPY. LTD
WESTMINSTER. LONDON.